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THE MONTHLY NEWSLETTER FOR ENERGY MANAGERS AND PUBLIC AFFAIRS OFFICERS

Issue 7

Message to Energy Managers

This month we spotlight three DON activities that initiated top-notch energy programs resulting in significantly reduced energy consumption.

Lieutenant Commander Wade Wilhelm, Navy Region Southwest (NRSW), CA spearheaded numerous energy initiatives that cut their electric demand through innovative energy management techniques, an awareness training campaign, and rigorous new energy policies. With his leadership, NRSW cut their electric demand by 30%.

Naval Undersea Warfare Center, Division Newport, RI improved its energy efficiency over last year by more than 13%. By installing lighting occupancy sensors, retrofit lighting and controls, and upgraded water and steam projects, they boast a 48% reduction in energy use since 1985.

And Naval Base Ventura County, CA was selected as one of the top ten "Green" projects by the American Institute of Architects Committee on the Environment. Their project includes daylighting, shading, innovative glazing elements, and photovoltaic power generation.



William F. Tayler
Manager Utilities/Energy

Starring in San Diego

With headline teams like the Padres and Chargers, the San Diego area has its share of star players. But there's another team in town called the U.S. Navy, and when it comes to energy, Lieutenant Commander (LCDR) Wade Wilhelm, Civil Engineer Corps, is a superstar.

In his dual capacities of Program Manager—Utilities for Navy Region Southwest (NRSW) and Head of the Utilities Business Line for Navy Public Works Center, San Diego (PWCS), LCDR Wilhelm developed and carried out a broad range of energy programs, projects and other initiatives.

These turned back the potentially disastrous cost and operational impacts of uncontrolled electricity prices and rolling blackouts that had characterized the California Energy Crisis. Having helped the San Diego region deflect the full impact of the Crisis, LCDR Wilhelm

focused much of his attention on Navy and Marine Corps bases in that area in FY01, improving the energy efficiency of the other five NRSW bases in California and Nevada.

LCDR Wilhelm's overriding objective in the past year or more has been to expeditiously cut the Navy's demand for electricity, 24 hours a day, 7 days a week. Energy efficiency projects and new renewable and self-generation projects often take a year or more to implement. LCDR Wilhelm took steps to immediately cut demand through innovative energy management techniques, an aggressive



NRSW's Lieutenant
Commander Wade Wilhelm

energy awareness and training campaign, and a series of rigorous yet reasonable new energy policies.

In short, he's done exceptional work. Lieutenant Commander Wilhelm implemented demand reduction measures that saved 70 million kilowatt-hours, worth approximately \$10.5 million, in Navy shore facilities in the San Diego area. He made far-reaching improvements to energy and utilities management practices, sustained a high level of energy awareness, and steered the development and award of \$48.2 million in financed energy efficiency and renewable energy

projects. These sweeping actions had the effect of cutting Navy shore facilities electrical demand by up to 30%.

None of this was automatic or easy. He developed new strategic energy policies. His work to streamline energy efficiency work included: expanding Resource Efficiency Management (REM) staff; implementing web-enabled MVWeb™ system to provide building-specific electrical load curve and other key data in a user friendly format; and

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DON Energy Awareness Website: Access the tools on the Navy Energy website for ideas, planning tips, and tools. Set your browser to <<http://energy.navy.mil>> and scroll down the left-hand column to the Awareness pick.

Newport is Hot on Conservation

Naval Undersea Warfare Center (NUWC), Division Newport, Rhode Island, is the largest single electric consumer at the Newport Naval Complex. The energy team relies heavily on energy conservation training, and its partners with associated commands for assistance and coordination in developing energy strategy, DSM, load curtailment, and other issues. In FY01 NUWC, Division Newport improved its energy efficiency by more than 13% over the previous year, and avoided consuming 1,868 MBTUs by investing \$40,382 in new energy conservation initiatives. Its budget payback on that investment: \$44,749!

NUWC Division Newport installed lighting occupancy sensors in three buildings, spending \$23,506 and saving \$13,131. They retrofit lighting and controls in three buildings, spending \$14,376, and saving \$5,918. They also upgraded energy supplies related to water and steam projects, saving \$25,700 after an investment of only \$2,500! In addition, energy managers identified, through facilities surveys, projects worth \$2,057,189 that will save \$782,416 a year.

The three leads on the energy team alone bring 50 years of experience to bear on Newport's energy programs. They took part in several weeks' worth of training in FY01 in digital controls, lighting, software, and other technologies. As part of its normal environmental management, system NUWC, Division Newport required on-line energy conservation training for all civilian, military and contractor personnel. The energy team was active in numerous regional energy and energy conservation meetings in FY01. And that put their training and exposure to new ideas to use in a broad range of Best Practices targeting interior and exterior lighting controls, door and window management, solar heating control, filter maintenance, and other measures. It is these kinds of nuts-and-bolts, institutionalized practices that have resulted in a 48% reduction in energy use since 1985!

ONR Research Discovers New Thermoelectric Technology

Findings May Impact DON Energy Managers

Scientists funded by the Office of Naval Research and Defense Advanced Research Projects Agency have taken an old idea, a thermocouple, and made it so efficient it could make both energy-hungry, freon-dependant refrigerators and power generators obsolete. The news was published in the science journal *Nature*.

By passing a current through thousands of super-thin layers of two different semi-conducting materials, scientists at the Research Triangle Institute (RTI) in North Carolina can make something hotter or colder (depending on which way the current flows) over 20,000 times faster than anything we have today. In addition to the astonishing cooling applications of such a device, these thermoelectric materials could be used to convert heat into electrical energy more efficiently than is possible now.

ONR began funding research in thermoelectric materials in 1993 to look for alternatives to freon-based cooling systems aboard Navy ships. The Navy investigated thermoelectrics in the 1960s and experimental thermoelectric cooling modules were put aboard the USS Dolphin in the 1970s. "The problem was that the materials just didn't have the efficiency needed to meet the cooling demands for wide-spread use in ship compartment cooling," comments John Pazik, ONR program manager on the research.

This marks the beginning of a new era in thermoelectrics. Ultimately these new materials will be engineered into many devices—eventually into plug-in modules—all at an affordable price. The RTI group has cleared the first hurdle: demonstrating the scientific feasibility of engineering such a material into prototype devices. ONR is also supporting solid state synthesis approaches to produce bulk thermoelectric materials. "The potential of all this could be truly significant and broad-based," says Rama Venkatasubramanian of RTI.

San Diego, from page 1

deploying energy managers and REMs to meet with personnel at each building and tailor energy use to actual operating requirements. He also initiated the use of load profile charts for the main complexes in the San Diego area and for the top energy-consuming buildings at those complexes to eliminate or minimize spikes and anomalies, usually through low- or no-cost management actions.

In addition, he steered one of the largest and most aggressive financed energy projects programs in the Federal government in FY01. As head of the Regional Energy Steering Committee (RESC), LCDR Wilhelm helped develop and award \$48.2 million in financed energy projects in FY01 and is working on millions more in projects for awards in FY02 and beyond. The program is comprised of \$25.9 million in Utility Energy Service Contracts and \$22.3 million in Energy Savings Performance Contracts. All of this has resulted in a dramatic expansion in energy management systems/direct digital controls.

His work has also benefited the Navy by bringing the most energy efficient technology available—from photovoltaics at NAS North Island and Naval Amphibious Base (NAB), Coronado to a microturbine project with heat recovery at NAB Coronado. Other projects include the retrofit or replacement of over 5,000 high intensity discharge (HID) lights with T5 or T8 fluorescent fixtures; replacement or upgrade of heating, ventilating and air conditioning systems; skylights in hangars, warehouses and other high bay facilities; and more.

Thanks to his work, with more than 780 kW in new photovoltaics capacity, the 116 kW of PV already in service, and the 675 kW of wind generating capacity at San Clemente Island will make the Navy one of the largest public sector generators of clean, renewable energy in California.

With LCDR Wilhelm's dedicated support, the three NRSW complexes in San Diego posted FY01 energy utilization indices of from 22.28% to 38.92% below the FY85 baseline, while PWCSO achieved 46.83% below the baseline.

Say, You Want a Revolution?

Well, a revolution is quietly occurring that could change the way we light our homes, offices, and world. Numerous industrial companies, as well as universities, are working to establish the fundamental science and technology to replace conventional lighting with semiconductor light-emitting diodes (LEDs), or solid state lighting.

"In some ways the revolution in lighting can be compared to the revolution in electronics that began 50 years ago and is only now reaching maturity," said James McGee, a scientist at Sandia National Laboratory. "Many of the possible applications for solid-state lighting will occur in ways that have not yet been envisioned."

Scientists say solid-state white light could change the way we live, and the way we manage and consume energy. LEDs, they say, could be ten times more efficient than incandescent bulbs, twice as efficient as fluorescents and would significantly reduce worldwide energy consumption.

Lighting is presently responsible for 20% of electric consumption. Researchers believe that the development and adoption of solid-state lighting technology could reduce electrical consumption by 10% of the 3,426 billion kilowatt hours the US alone uses annually.

GE made the first LEDs in 1962. The first products from 1968 to 1985 were tiny. Then LED power was increased, making them more useful. Blue, red and green lights eventually followed. With that palette to work from it is now possible to generate white light for illumination.

One not so surprising caveat is that LED-based light sources are very expensive and won't be practical until their costs are reduced and efficiency is increased. To make this possible, researchers are working to do this by:

- Better understanding the physics of materials that are the base materials of the LEDs;
- Improving optoelectronic devices and materials for photon generation and efficiency;
- Improving wavelength conversion and color mixing technologies for white light; and
- Improving technologies for high-power LEDs.



FEMP (DOE) Checklist to Reduce Fuel Costs

Print, save, distribute, use!

Buildings

- Check/adjust combustion efficiency of gas-fired equipment
- Lower thermostat settings
- Lower setback temperatures
- Optimize morning warmup and night setback controls
- Reduce/eliminate major sources of infiltration
- Minimize use of outside air for process ventilation
- Modify work activities
- Minimize the use of gas-fired refrigeration equipment

Central Heating Plants

- Conduct boiler efficiency tests
- Optimize combustion efficiency
- Perform boiler maintenance
- Minimize boiler blowdown
- Optimize steam plant heat balance
- Minimize deaerator steam venting
- Optimize boiler loading

Thermal Distribution

- Inspect/replace steam traps
- Inspect/repair condensate return equipment
- Locate/repair steam leaks
- Repair insulation
- Isolate non-essential distribution piping
- Reduce distribution pressure

NB Ventura County Wins Honors

In recognition of Earth Day, The American Institute of Architects (AIA) Committee on the Environment (COTE) selected its annual Top Ten "Green" Projects, ten examples of architectural design solutions that protect and enhance the environment. This year's winners included projects designed for the Federal government, large and small businesses, nonprofit organizations, and individuals—proving the environmental, social, and economic benefits of sustainable design for clients of any size. Among the winners is Naval Base Ventura County's Building 850, Energy & Sustainability Showcase Project, Port Hueneme, California.

The project is home to the Naval Base Ventura County Public Works Department. It consists of 10,000 square feet of renovated space and 7,000 square feet of new construction. Incorporated concepts and systems include: daylighting, shading, and innovative glazing elements; maximum use of natural ventilation; photovoltaic power generation; solar space and domestic water heating systems; lighting with continuously dimming electronic ballasts and occupancy and photo sensor controls.

It includes real-time energy monitoring; HVAC systems demonstrating several new technologies including prototype natural-gas heat-pump air conditioning,

variable air volume under-floor air distribution, and high-efficiency pulse boilers. The building also features a gray water system for capture and reuse of rainwater and lavatory discharge; self-sustaining landscaping and water conserving irrigation system; indoor air quality monitoring; and extensive use of recycled building materials. Project designers used physical and computerized modeling to optimize the interaction of daylighting with building envelope, interiors, and systems.

For design and engineering info: Malcolm Lewis, PE, mlewis@ctg-net.com, 949-790-0010. To see descriptions of the winners, visit www.aia.org.

Check It Out



Good Meeting, Good Meeting!

Teaming for Efficiency, 18-23 August, Pacific Grove, CA. Presentations, meetings for individuals who work to promote energy efficiency in buildings through technologies, programs and policies. Organized by American Council for an Energy-Efficient Economy (ACEEE). Info: Rebecca Lunetta, 301-292-3966.

Electrical System Design for the Non-Electrical Engineer, 09-13 September, Madison, WI. Step-by-step procedure used by design engineers and technicians, basic electrical distribution design and industrial and commercial systems, application of National Electrical Code to design procedures. Offered by University of Wisconsin-Madison; \$1,295. Info: 800-362-0876.

Natural Gas Technologies Conference and Expo, 29 September - 02 October, Orlando, FL. Technologies now available to energy managers. Sponsored by DOE National Energy Technology Laboratory; \$595. Info: Bonnie Feingold, 847-768-0815.

World Engineering Congress/25th Anniversary WEEC, 9-11 October, Atlanta, GA. Billed as the nation's largest energy marketplace, with information on new products and technologies, demonstrations, and skills sessions on implementing energy efficient systems, controls and programs. Organized by Association of Energy Engineers. Info: Ted Kurklis 770-449-1595.

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Watts News?

We want to hear from you.

Tell us about the energy initiatives you're working on, the problems you encounter, and the solutions you discover.

Submit article ideas, comments, or questions to:

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Be sure to include your name and commercial phone number.

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